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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/343,093	06/30/1999	SHOSHI KATAYAMA	862.2907	7483

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FITZPATRICK CELLA HARPER & SCINTO
30 ROCKEFELLER PLAZA
NEW YORK, NY 10112

EXAMINER

STOCK JR, GORDON J

ART UNIT	PAPER NUMBER
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2877

DATE MAILED: 05/04/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

H/A

Office Action Summary

Application No.

09/343,093

Applicant(s)

KATAYAMA, SHOSHI

Examiner

Gordon J. Stock

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 February 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 51-61 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 51-61 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 03 September 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>20020522</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. The Amendment received on February 17, 2006 has been entered into the record.

Information Disclosure Statement

2. The information disclosure statement (IDS) submitted on May 22, 2002 is being considered by the examiner.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. **Claims 51-61** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Nishi (5,243,195)**—previously cited in view of **Matsuura et al. (4,566,795)**—previously cited further in view of **Inoue et al. (6,384,898)**—previously cited and further in view of **Tanimoto (4,711,567)**

As for **claims 51, 52, 56-59**, Nishi in a projection exposure apparatus discloses the following: a movable stage configured to hold the wafer (Fig. 2: WST); a scope, an image sensing systems comprising an off axis alignment system (**claim 56**: Fig. 10) with two ccd cameras (**claim 52**: Fig. 10: 4x and 4y) for sensing mark images on the wafer stage (**claim 58**: Fig. 9; Fig. 10: IMP); a stage position measurement system comprising a laser interferometric system (**claim 57**): an interferometric system to measure the wafer stage at a plurality of points with a controller, a main control system, comprising an arithmetic system, a calculation section; whereas, the measurement system measures while the image sensing system accumulates data at

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substantially the same time and senses the image while the stage is moving and suggesting that the stage is moved at a constant speed (**claim 59**) for smooth scanning to guarantee coordination of values (**claim 51**: Figs. 2, 7, 10, 24; col. 3, lines 5-65; col. 4, lines 30-50; col. 11, lines 1-20; col. 15, line 35-55; col. 18, lines 20-35; col. 25, lines 34-50). Specifically, the ccd cameras of the OWA system obtain image data of one accumulated image such as from FM₁ by accumulating image signals formed on said image sensor, ccd camera during an accumulation period (col. 16, lines 8-15).

As for the stage position measurement system measuring a position of the stage a plurality of times during the accumulation period of said image sensors, Nishi does not explicitly state this. Nishi does imply this for the interferometers measure the stage simultaneously with the scanning of the fiducial marks (col. 17, lines 55-67; col. 18, lines 1-30). And Matsuura in an alignment apparatus teaches continuously measuring the stage position with interferometric systems (col. 12, lines 5-20). Therefore, it would be obvious to one of ordinary skill in the art at the time the invention was made to have the interferometric system measuring the stage position continuously, a plurality of times, in order to precisely know the position of the stage at all times and to have precise a correlation between the position of the stage and the position of the mark image in order to properly calculate the position of the mark.

As for the main control system calculating the position of the mark based on the image data and data of plural positions of the stage measured, Nishi in view of Matsuura do not explicitly state this; however, Inoue in a projection exposure apparatus teaches the determining of mark position data via stage position data and image data (col. 4, lines 60-67; col. 5, lines 1-15). Therefore, it would be obvious to one skilled in the art at the time the invention was made

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to have the calculation section/arithmetic section calculate mark position based on the image data and the stage position information in order to accurately determine the position of the mark relative to the stage and imaging system.

In addition, Nishi discloses the off axis system suggests average positioning of the mark (col. 16, lines 1-20). Nishi does not explicitly state averaging the plurality of stage positions. However, Inoue teaches averaging both imaging signals and stage positions for highly accurate position determination (col. 10, lines 1-13). And Tanimoto in an exposure apparatus teaches averaging the stage position to get an accurate position of an image (col. 31, lines 10-30; col. 43, lines 37-42). Therefore, it would be obvious to one of ordinary skill in the art at the time the invention was made to average the plurality of stage position values during the scanning of the mark to produce a highly accurate mark position when correlating the stage position and mark image data.

As for **claims 53-55**, Nishi in view of Matsuura, Inoue, and Tanimoto disclose everything as above (see **claim 51**). Nishi ('195) is silent concerning synchronism of the scope and position measurement system. However, Inoue teaches synchronism of the scope and stage position measurement system (col. 8, lines 54-67; col. 9, lines 1-10). Therefore, it would be obvious to one of ordinary skill in the art at the time the invention was made to have a synchronism signal between the stage positioning and scope to have simultaneous measurement of stage position with mark image collection for highly accurate alignment.

As for **claim 60**, Nishi in view of Matsuura, Inoue, and Tanimoto disclose everything as above (see **claim 51** above). In addition, Nishi suggests the main control system controls

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everything, provides, determines such modes as checking rotational error, Abbe error determination, rough and fine alignment modes for the marks (cols. 18-20).

As for **claim 61**, Nishi in view of Matsuura, Inoue, and Tanimoto discloses everything as above (see **claim 51**). In addition, Nishi discloses the exposure system exposes a pattern on the wafer from the reticle after alignment and positioning is done (col. 2, lines 60-67; col. 6, lines 60-67; col. 7, lines 1-15); the exposed substrate is developed (col. 47, line 5). Nishi is silent concerning a processing step following development. However, Matsuura teaches that an etching process follows development (col. 16, lines 20-25). Therefore, it would be obvious to one of ordinary skill in the art at the time the invention was made to follow the development by an etching process in order to produce circuit features on the wafer from the developed pattern.

Response to Arguments

5. Applicant's arguments with respect to the claims have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure: U.S. Patent 4,780,616 to Nishi et al. (specifically, synchronism: col. 5, lines 9-16)

7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after

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the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Fax/Telephone Numbers

If the applicant wishes to send a fax dealing with either a proposed amendment or a discussion with a phone interview, then the fax should:

1) Contain either a statement "DRAFT" or "PROPOSED AMENDMENT" on the fax cover sheet; and

2) Should be unsigned by the attorney or agent.

This will ensure that it will not be entered into the case and will be forwarded to the examiner as quickly as possible.

Papers related to the application may be submitted to Group 2800 by Fax transmission. Papers should be faxed to Group 2800 via the PTO Fax machine located in Crystal Plaza 4. The form of such papers must conform to the notice published in the Official Gazette, 1096 OG 30 (November 15, 1989). The CP4 Fax Machine number is: (571) 273-8300

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Gordon J. Stock whose telephone number is (571) 272-2431.

The examiner can normally be reached on Monday-Friday, 10:00 a.m. - 6:30 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory J. Toatley, Jr., can be reached at 571-272-2800 ext 77.

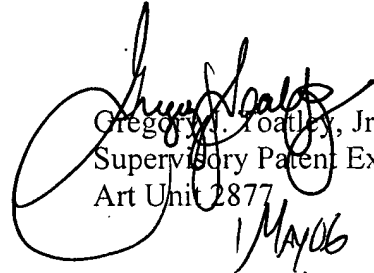
Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications

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may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private Pair system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

gs

April 27, 2006


Gregory M. Roatley, Jr.
Supervisory Patent Examiner
Art Unit 2877
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